ESTHETIC REHABILITATION OF SMILE DESIGN
WITH CERAMIC VENEERS.
CASE REPORT

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Introduction

Since their introduction in the early 1980’s ceramic veneers have gained wide acceptance as a primary mode of restoration in esthetic dentistry(1). As patients’ aesthetic expectations continue to increase, dental teams are challenged to identify a systematic approach for achieving natural oral and facial aesthetics with ceramic veneers. Advances in ceramic materials and veneering techniques allow practitioners to restore function and aesthetics using conservative and biologically sound methods as well as promoting long-term oral health(2,3).

Aesthetics, treatment planning and clinical care should be considered in accordance with the interrelationship between the teeth, gingival tissues, lips and face. Consideration as to how the facial and psychological parameters can influence a natural smile design must also be taken into account. Because ceramic veneers are primarily indicated for the improvement of aesthetics, the design of the smile should respect the symmetry and the harmonious arrangement of dento-facial elements(4,5).

The patient is often the final judge of restorations in aesthetically driven treatment. If the clinician and patient do not have the same results in mind, there is the possibility that the patient will not approve the definitive restorations. For these reasons it is important to accurately visualize the restorations before finalization (6,7).

Case report

A 42 year old female patient presented for aesthetic treatment of a large diastema, and irregular display of frontal teeth. Figure 1 shows the patient’s smile before treatment. She was concerned about the vestibularisation and distalisation of 11, and the progressive enlargement of the diastema. She also desired a lighter colour and wanted all her frontal teeth to appear straight without orthodontic treatment.

Following a detailed clinical examination, digital photography and imaging software were used to record and evaluate the objective parameters of the patient’s smile.

The treatment plan included the following objectives:
- reduce the diastema between 11 and 21
- align and reduce the inclination of 11
- add length and volume(facial) to teeth:12, 13, 22, 23

Summary:

Minor changes of shape, shade and position of teeth with ceramic veneers, can dramatically affect the appearance of our patients. This paper describes the esthetic rehabilitation of the smile design of one female patient with six ceramic veneers. The clinical and technical protocol used allows the visualization of the final result prior to fabrication and fitting the definitive veneers.

Keywords: ceramic veneers, smile design.
All of these concerns could be addressed with porcelain veneers. These veneers have the advantage of preserving most of the natural tooth structure while achieving all the cosmetic goals. Since some of her anterior teeth exhibited a flat contour, additional facial bulk was desirable.

It is important for the clinician and the patient to visualize and agree upon the final result prior to commencing treatment. To accomplish the visualization mock-ups were made to find the fine balance between length, width and position of each frontal tooth. The relationship between the lips and teeth in functional movement, rest position and phonetics was tested with the mock-ups. Based on the composite mock-up, a diagnostic wax-up was made and discussed with the patient and the technician. An index in putty silicone was taken and sent to the laboratory.

Prior to beginning preparation of the teeth, the colour of ceramic veneers was chosen. The patient presented initially with a D3 shade and wanted a lighter shade. Shade D2 in the incisal two thirds, and B3 in the gingival one third were considered to be a good choice.

Tooth reduction began by using a 0.5mm depth cutting bur on the buccal wall, starting from the gingival level to the incisal edge. The reduction was accentuated for the distal part of tooth 11. For teeth 12, 13, 22 and 23 only slight reduction was used to allow for addition of porcelain without creating over-contoured restorations. A long tapered chamfer ended diamond bur was used to reduce the buccal wall, creating definite gingival and interproximal finishing line angles. The chamfer was taken slightly into the interproximal areas to allow the veneers to cover all the visible aspects of the teeth. The distal face of the right central incisor was more aggressively prepared to allow the illusion of straightening. Figure 4 shows the finished preparations from the buccal view.

Full arch impressions were taken with a polyvinyl siloxane impression material and an occlusal registration was made. Lab instructions included the underlying and final shades, the desired length, width and position of frontal teeth.

The next step was to fabricate the provisional restorations. A vacuum formed shim was made over a stone model made by duplicating a preoperative wax-up of the desired form. The enamel of the facial surfaces of the prepared teeth were spot etched with 37 percent phosphoric acid gel for fifteen seconds, then rinsed and dried. The vacuum formed shim was filled with microfilled composite resin and placed over the prepared teeth. A curing light was used to harden the composite resin material and the shim was removed from the patient’s teeth.

At the dental laboratory, refractory stone models of the prepared teeth were made and 6 veneers from feldspatic porcelain Noritake were fabricated. The six veneers were inspected in the dental office prior to the appointment of the seating. Fit, natural appearance, translucency and the absence of the black triangle in the gingival area were checked.

The porcelain veneers were tried in using a try-in glycerin medium (Variolink-Try-in kit, Vivadent), and the most convenient shade was selected.

Rubber dam and retraction cord was placed to prevent gingival fluids from contaminating the teeth during the bonding process. The teeth were pumiced and thoroughly rinsed and left slightly moist for the wet bonding procedure. A dentin and enamel bonding agent (Excite, Vivadent) was applied using a brush and dried with an air syringe to remove the solvent carrier and residual water.

The internal aspect of the veneers were rinsed, etched with hydrofluoric acid, treated with silane (Monobond S, Vivadent) for thirty seconds and coated with a bonding agent to increase the bond between the ceramic and composite resin luting agent. A curing composite resin luting agent (Variolink II, Vivadent), was placed inside the veneers and the veneers were placed on the prepared teeth. Excess luting composite was removed with a brush and a light-curing unit was used to spot cure each veneer in place before additional excess was removed. Floss was gently placed into the interproximal areas to remove uncured resin. This was followed by labial and lingual simultaneous light curing for 60 seconds. All six anterior teeth were then covered with glycerine and light cured again for 20 seconds.

Carbide-finishing burs were used to remove excess cured composite resin at the margins and aluminium oxide polishing strips were used to smooth these areas. Slight occlusal adjustments were accomplished with carbide finishing burs. Polishing cups and points were used to bring all surfaces to a smooth finish. Figure 5 present the 6 ceramic veneers from the facial retracted view after cementation. The patient smile can be seen in the close-up view.

Discussion

Bonded porcelain veneers have a number of significant advantages over metal-ceramic or all-ceramic
crowns (2,8). One of the most important advantages is that they are extremely conservative in terms of tooth structure. Conservation of tooth structure is a major factor in determining the long-term prognosis of any restorative procedure.

Another remarkable advantage of porcelain veneers is their durability. As long as sufficient tooth structure remains to provide adequate support for the bonded porcelain the incidence of fracture is very low. This durability allows minimal reduction resulting in decreased potential pulpal involvement.

The periodontal response is outstanding. The restoration can blend imperceptibly with the cervical tooth structure, allowing the cervical margins to be kept in a supragingival position(9). These cervical margins should be placed in enamel; however, with contemporary dentin bonding systems, margins can be successfully placed on the dentin/cementum when necessary (10).

Like every procedure in dentistry, the success of porcelain veneers depend upon understanding the principles involved in their fabrication and application. The success of treatment with ceramic veneers can be assured if the dentist follows a defined protocol with each patient to ensure that all factors such as smile design, margin placement, material and shade selection are considered. Communication between patient, dentist and technician must be rigorously controlled (7)
as well. When utilizing anterior veneers the current evidence suggests that when all of these factors are thoroughly considered, dentists can achieve predictable results which are satisfactory to their patients (11).

The patient is often the final judge of restorations in aesthetically driven treatment. If the clinician and patient do not have the same results in mind, there is the possibility that the patient will not approve of the definitive restorations. Thus it is critical to provide sufficient visualization to the patient before finalization (6,12).

**Conclusion**

This article describes the treatment of six maxillary anterior teeth with porcelain veneers using a practical approach that allows the dentist and the patient to agree on the appearance of the final restorations prior to actual fabrication and fitting of the definitive veneers. Excellent esthetics can be achieved with minimal reduction because of the cover ability of the porcelain used, and the scattering effect of the luting resin.

**References:**